

Boskamp, Eddy B.

S/N: 10/063,550

**REMARKS**

Claim 1-8 and 10-28 are pending in the present application. Initially, it is noted that Applicant filed its last Amendment on March 15, 2004. The current Office Action was mailed nearly a year later and is not responsive to Applicant's amendments and detailed response. As will be shown, in the Office Action mailed February 23, 2005, it seems the Examiner did not consider the amendments made in the March 15, 2004, Amendment, and, instead, sustained the previous basis of rejection without addressing the amendments and arguments previously presented. Specifically, the Examiner rejected claims 1, 2, 4, 6, 7, 17, 18, 20-23, and 25-28 under 35 U.S.C. §102(b) as being anticipated by Leussler (USP 5,245,288). Claims 3, 8, 10, 11-16, and 24 were rejected under 35 U.S.C. §103(a) as being unpatentable over Leussler, and further in view of Schotz (USP 5,581,617). Claim 20 was rejected under 35 U.S.C. §103(a) as being unpatentable over Leussler, and further in view of Goto (USP 6,218,834). Additionally, the Examiner rejected claims 17-22 under 35 U.S.C. 112, first paragraph, as allegedly failing to comply with the enablement requirement. The Examiner also rejected claims 17-22 under 35 U.S.C. 101 "because the claimed invention is not supported by either a lack of asserted utility or a well-established utility."

**REJECTIONS UNDER §112/§101**

The Examiner rejected claims 17-22 under both §112 and §101 for calling for "battery-less means for powering the means for wirelessly transmitting." However, Applicant has amended claim 17 to 1) broaden the claim by removing the "battery-less means" element and 2) clarify the invention by calling for "means for wirelessly transmitting the signals with a UHF carrier frequency signal to a receiver means." (Emphasis added). That is, as will be addressed below, the signals resulting from the excited nuclei in the subject are modulated "with a UHF carrier frequency signal," which is not taught or suggested by the art of record. Similarly, claim 21 has been amended to clarify the MRI system includes "means for acquiring power from at least a B field

Boskamp, Eddy B.

S/N: 10/063,550

associated with an RF pulse sequence to recharge at least one battery." For at least these reasons, the rejections under §112/§101 are moot.

#### REJECTIONS UNDER §102

In the previous Office Action mailed February 11, 2004, the Examiner rejected claims 1, 2, 4, 6, 7, 17, 18, 20-23, and 25-28 as being anticipated by Leussler. Responsive thereto, Applicant filed an amendment to independent claims 1, 7, 17, and 28. Accompanying the amendments were detailed explanations setting forth the reasons Applicant believed the claims to be in condition for allowance. However, these amendments and remarks were, for the most part, unaddressed by the Examiner as the previous rejection was reiterated without explanation of how the art of record applies to the claims as amended or rebuttal of the argument accompanying the amendment. Such is not a proper response to Applicant's amendments and detailed explanations. That is, MPEP § 707.07 requires that an Office Action must be "complete as to all matters." Therefore, the Examiner must provide detailed remarks and explanation of how the art of record applies to the claims as amended and detailed remarks and explanation rebutting of the argument accompanying the amendment.

In particular, with respect to claim 1, Applicant amended claim 1 to clarify the claimed invention by calling for "an oscillator configured to generate a carrier signal." Furthermore, claim 1 was amended to call for "a modulator wired to the oscillator to modulate the carrier signal." (Emphasis added). As such, Applicant explained, "Claim 1 is clearly distinguishable over Leussler in that communication from the oscillator 200 to the block circuit 100 is achieved via wireless transmission between antenna 226 and antenna 121." Applicant then concluded, "Therefore, Leussler does not teach a wired modulator and oscillator, as claimed and as shown in Fig. 2." However, nowhere in the Final Office Action mailed February 23, 2005 did the Examiner address this amendment in any way. That is, the Examiner merely sustained the previous rejection and added:

Regarding claims 1 and 28: Leussler clearly anticipates all features in claim 1 where an MRI imaging system includes RF coil with wireless transmission of the modulated signal via oscillator 200 (*sic*) where the transmitted signals are modulated (col. 5, lines 27-52).

Boskamp, Eddy B.

S/N: 10/063,550

It seems apparent that the Examiner did not consider the amendment and remarks regarding the configuration of the oscillator being wired to the modulator to modulate a carrier wave generated by the oscillator because no reference to the amendment was made in the above-cited sentence. Furthermore, the very section cited by the Examiner is directly the contrary to proposition for which it was cited. Specifically, Leussler explicitly states that the carrier signals may be "derived from a common reference oscillator 200" that controls "[t]he output signal [from oscillator 224]...which is connected to an antenna 226 which cooperates with the antenna 121 in the transmitter." Col. 5, lns. 17-33 and 53-57. Therefore, as clearly shown in Fig. 2 and explained in the very section cited by the Examiner, Leussler does not teach or suggest "an oscillator configured to generate a carrier signal" and "a modulator wired to the oscillator to modulate the carrier signal," as called for in claim 1. To the contrary, Leussler is clear that any such connection is wirelessly made between antennae 121 and 226.

For at least these reasons, claim 1 is patentably distinct from the art of record. Furthermore, claims 2-6 are in condition for allowance pursuant to the chain of dependency.

Similarly, regarding claim 7, Applicant amended the claim in the March 15, 2004, Amendment, to clarify that the kit, while "configured to retrofit an existing MRI apparatus to wirelessly transmit an MR signal from a receive coil... to a receiver," does not include components configured to retrofit the existing MRI apparatus to wirelessly transmit data to the receive coil. Specifically, to this end, Applicant amended claim 7 to clarify that the kit consists of a modulator, a transmitter, and a receiver to transmit an MR signal from a receive coil. Applicant amended the claim to consist of these components rather than comprise the components for the sole purpose of excluding components configured to wirelessly transmit data to the receive coil. Applicant explicitly stated that claim 7 was intended to be limited for this sole purpose.

However, the Examiner did not address this patentable distinction and instead concluded that "claims 7 does not disclose any element being configured to retro fit to a MRI system" and, "[t]herefore, the rejection stands from the previous office action." Claim 7, however, explicitly calls for "[a] kit configured to retrofit an existing MRI

Boskamp, Eddy B.

S/N: 10/063,550

apparatus." Claim 7 continues by calling for a modulator, a transmitter, and a receiver that, together, form the kit that is configured to retrofit an existing MRI apparatus. Therefore, the Examiner's conclusion that "claim 7 does not disclose any element being configured to retrofit to a MRI system" is clearly incorrect based on the elements explicitly called for in claim 7.

Therefore, when claim 7 is properly considered, the rejection cannot be sustained. That is, as Applicant previously explained and the Examiner did not address, "Leussler is clear that all transmission to and from the receive coil 10 and accompanying circuit block 100 is achieved wirelessly via input antennas 226 and 221 and output antennas 115 and 210." March 15, 2004, Amendment, *see also* Leussler, Fig. 2. To clarify this point, Applicant further explained, "Leussler is clear that all components of the circuit block 100 may be 'mounted on a suitable substrate... so that this unit can be used for other coils.'" March 15, 2004, Amendment, citing Leussler, col. 4, lns. 46-50. As such, any kit, as taught by Leussler, would necessarily include the components of circuit block 100 which are particularly designed for wireless transmission to and from the circuit block 100. Leussler does not teach any other arrangement. Therefore, claim 7 calls for a configuration that is an improvement over Leussler in that it requires less components and limits wireless transmission, which leads to a reduced chance of interference. The Examiner cannot disregard these patentable distinctions.

Therefore, as claim 7 is particularly limited to not include wireless transmission of data to the receive coil, claim 7 calls for a kit that is patentably distinct from any kit specifically taught or suggested by Leussler. *See* Col. 4, lns. 46-50. Accordingly, claims 23-27 are in condition for allowance at least pursuant to the chain of dependency.

Regarding claim 8, the Examiner reiterated the previous rejection and added that "Leussler clearly anticipated the use of high frequency transmission of RF signal to the signal processor over short range (col. 6, lines 22-51)" but "does not specifically disclose the frequency of transmission." However, Leussler clearly describes the frequency of transmission and is explicit that it is not and cannot be in the UHF frequency range.

In particular, Leussler specifically teaches away from any transmission frequency substantially greater than "a few MHz to a few 100 MHz." Col. 3, lns. 67-68. Leussler

Boskamp, Eddy B.

S/N: 10/063,550

teaches that "the spin resonance signal is mixed with a mixing signal of constant frequency  $f_1$ ." Col. 3, lns. 55–57. Leussler continues by teaching that the transmission output signal "contains components having the difference frequency  $f_1 - f_0$  or the sum frequency  $f_1 + f_0$ ." Col. 3, lns. 60–62. Finally, Leussler teaches that "[t]he frequency  $f_1$  of the mixing signal is chosen (from a few MHz to a few 100 MHz)." Col. 3, lns. 67–68 (emphasis added). Therefore, one of ordinary skill in the art will readily recognize that since the mixing frequency  $f_1$  is chosen from between a few MHz to at most a few 100 MHz, the highest output frequency of any output signal would be only slightly more than a few hundred MHz. That is, since the output signal "contains components having the difference frequency  $f_1 - f_0$  or the sum frequency  $f_1 + f_0$ " and  $f_1$  is chosen from between a few MHz to a few 100 MHz, the sum frequency could not be more than a few 100 MHz. See col. 3, lns. 55–68. As such, Leussler is clear that modulation and transmission of carrier frequencies cannot reach the UHF range. That is, since the UHF range is clearly defined to extend from approximately 300 Mhz to 3 Ghz (see IEEE definition enclosed), Leussler clearly teaches away from the UHF frequency range by stating that "[t]he frequency  $f_1$  of the mixing signal is chosen (from a few MHz to a few 100 MHz)." Col. 3, lns. 67–68 (emphasis added). Therefore, Leussler explicitly excludes frequencies in the UHF range that are above "a few MHz", for example, more than a Ghz.

However, the Examiner did not address this clear teaching of Leussler and instead concluded that "Schotz et al. teaches that in wireless transmission over short range, the frequency of the transmission is at least 900 Mhz" and, "[t]herefore, Schotz et al.'s teaching clearly shows state of art where the improvement of wireless transmission of RF signal in Leussler is obvious to one skill in the art." The Examiner's conclusion is improper under MPEP §§2141.02 and 2145, and thus, the rejection cannot be sustained.

First, Leussler is specifically directed to the wireless transmission of spin resonance signals from an MR examination apparatus. See Title of Leussler. On the other hand, Schotz et al., as is indicated in the very section cited by the Examiner, is particularly concerned with the short range transmission of audio data from an audio system to an audio source. Col. 2, lns. 40–50. As such, the references are directed to

Boskamp, Eddy B.

S/N: 10/063,550

very different purposes and there is no motivation to combine these references in the way done so by the Examiner. See MPEP §2141.02.

Second, under MPEP §§2141.02 and 2145, a combination of Leussler and Schotz et al. is impermissible because Leussler explicitly excludes frequencies above “a few 100 MHz.” Col. 3, lns. 67–68. That is, under MPEP §2141.02, “A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.” MPEP §2141.02 citing *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). As such, Leussler’s teaching that “[t]he frequency  $f_j$  of the mixing signal is chosen (from a few MHz to a few 100 MHz)” must be considered. Col. 3, lns. 67–68 (emphasis added). Accordingly, it is improper to combine Leussler and Schotz et al. for the purpose of asserting that the system of Leussler could be modified to include transmission frequencies in the UHF frequency range, because “[i]t is improper to combine references where the references teach away from their combination.” MPEP §2145 citing *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983).

Therefore, as claim 8 is patentably distinct from the art of record. Furthermore, claims 10–16 are in condition for allowance pursuant to the chain of dependency.

Regarding claim 17, Applicant has amended the claim to, in part, call for “means for wirelessly transmitting the signals with a UHF carrier frequency signal to a receiver means.” Therefore, for at least the reasons addressed above with respect to claim 8, claim 17 is patentably distinct from the art of record.

Additionally, Applicant has amended claim 21 to call for “at least one battery and means for acquiring power from at least a B field associated with an RF pulse sequence to recharge at least one battery.” However, when addressing such, the Examiner stated that though “Leussler fails to teach acquiring power from a B field,” “in the art of MRI that the B field understood as homogenous mean magnetic field would be generated when nuclei in the subject is excited by a gradient field.” However, while not only technically incorrect, the Examiner’s statement does not address that which is called for in claim 17 or 21.

Boskamp, Eddy B.

S/N: 10/063,550

First, the homogenous  $B_0$  field is not "generated when nuclei in the subject is excited by a gradient field," as the Examiner asserted. Rather, when human tissue is subjected to the uniform magnetic  $B_0$  field, the individual magnetic moments of the spins in the tissue attempt to align with this polarizing field, but precess about it in random order at their characteristic Larmor frequency. Then, when the tissue is subjected to an RF magnetic field (excitation field  $B_1$ ), longitudinal magnetization may be tipped into the x-y plane to produce a net transverse magnetic moment  $M_t$ . Accordingly, a signal is emitted by the excited spins after the excitation signal  $B_1$  is terminated and this signal may be received and processed to form an image. Therefore, the Examiner's statement that "in the art of MRI that the B field understood as homogenous mean magnetic field would be generated when nuclei in the subject is excited by a gradient field," is technically incorrect.

Second, beyond the technical inaccuracy of the Examiner's position, the Examiner did not address and the art of record does not teach or suggest "at least one battery and means for acquiring power from at least a B field associated with an RF pulse sequence to recharge at least one battery."

For at least these reasons, claims 17 and 21 are patentably distinct from the art of record. As such, claims 18–22 are in condition for allowance at least pursuant to the chain of dependency.

Regarding claim 28, though Applicant amended the claim to clarify the invention, the Examiner did not address the amendment or Applicant's remarks in support of patentability. In particular, claim 28 calls for "an RF transceiver system wired to a modulator." Therefore, claim 28 was amended to clarify that the modulator is configured to modulate a carrier signal which is transmitted wirelessly from a transmitter. As previously shown with respect to claim 1, Leussler clearly teaches that all communication into and out of circuit block 100 is achieved by way of wireless communication via antennas 121, 226, 115, and 210. Accordingly, for at least these reasons, claim 28 is patentably distinct from the art of record.

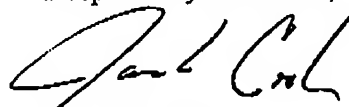
Boskamp, Eddy B.

S/N: 10/063,550

Therefore, in light of at least the foregoing, Applicant respectfully believes that the present application is in condition for allowance. As a result, Applicant respectfully requests timely issuance of a Notice of Allowance for claims 1-8 and 10-28.

Applicant appreciates the Examiner's consideration of these Amendments and Remarks and cordially invites the Examiner to call the undersigned, should the Examiner consider any matters unresolved.

Respectfully submitted,



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**UART** See: universal asynchronous receiver/transmitter.

**UAT** See: unit auxiliaries transformer.

**UC** See: utility controller.

**UDF** See: unit development folder; software development file.

**UDT** See: unidirectional transducer.

**$U_{50}$**  A transient overvoltage level that produces a 50% probability of sparkover. (T&D/PE) 516-1995

**ufer ground** See: concrete-encased ground electrode.

**UHF** See: ultra-high frequency.

**UHF radar** See: ultra-high-frequency radar.

**uhv** See: ultra-high voltage.

**UI** See: unscheduled interrupt; unit interval; user interface.

**UIB** See: unit initialization block.

**ULF** See: ultra-low frequency.

**ULSI** See: ultra-large scale integration.

**ultimate deformation or displacement (raceway systems for Class 1E circuits for nuclear power generating stations)** The maximum deformation or displacement an element can undergo without failure. (PE/NP) 628-1987r

**ultimate load (raceway systems for Class 1E circuits for nuclear power generating stations)** The maximum load an element can carry without failure as obtained from failure load tests or manufacturer's recommendations, whichever is less. (PE/NP) 628-1987r

**ultimately controlled variable (control)** The variable the control of which is the end purpose of the automatic control system. See also: feedback control system. (IM/IA/ICTL/IAC) [120], [60]

**ultimate mechanical strength (insulators)** The load at which any part of the insulator fails to perform its function of providing a mechanical support without regard to electrical failure. See also: insulator. (EEC/IEPL) [89]

**ultimate mechanical strength-static (UMS-static)** The load at which any part of the surge arrester fails to perform its mechanical function. (SPD/PE) C62.11-1999

**ultimate period** See: undamped frequency.

**ultimate strength (1) (power distribution)** The tensile load at which any part of the insulator fails to perform its function of providing mechanical support based on a short term test. (T&D/PE) 1024-1988w

**(2) (power distribution)** The rated breaking strength of a material determined by the results of tests to destruction. (T&D/PE) 751-1990

**ultimate strength rating** The minimum tensile strength allowed on a test of five insulators. (T&D/PE) 1024-1988w

**ultra-audible frequency** See: ultrasonic frequency.

**ultra-audio oscillator** See: Colpitts oscillator.

**ultrafiche** In micrographics, microfiche with images reduced more than ninety times. (C) 610.2-1987

**ultra-high frequency (UHF)** 300 MHz to 3 GHz. See also: radio spectrum. (AP/PROP) 211-1997

**ultra-high-frequency radar (UHF radar)** A radar operating at frequencies between 300 MHz and 1000 MHz, usually in one of the International Telecommunication Union (ITU) bands allocated for radiolocation: 420-450 MHz or 890-942 MHz. Note: Radars between 1 GHz and 3 GHz, although within the UHF band as defined by the ITU, are described as L-band or S-band radars, as appropriate. (AES) 686-1997

**ultra-high voltage (uhv)** A term applied to voltage levels that are higher than 800 000 V. (T&D/PE) 516-1995

**ultra-high-voltage system** An electric system having a maximum rms ac (root-mean-square alternating current) voltage above 800 000 V to 2 000 000 V. (PE/TR) C57.12.80-1978r

**ultra-large scale integration** Pertaining to an integrated circuit containing more than 106 elements. Contrast: medium scale integration; large scale integration; very large scale integration; small scale integration. (C) 610.10-1999

**ultra-low frequency (ULF)** Lower than 3 Hz. See also: radio spectrum. (AP/PROP) 211-19

**ultrasonic cross grating (grating)** A space grating resulting from the crossing of beams of ultrasonic waves having different directions of propagation. Note: The grating may be two- or three-dimensional. (SP) [3]

**ultrasonic delay line** A transmission device, in which use is made of the propagation time of sound to obtain a time delay of a signal. (SP) [3]

**ultrasonic depth finder (navigation aids)** A direct reading instrument that determines the depth of water by measuring the time interval between the emission of an ultrasonic signal and the return echo from the bottom. (AES/GCS) 172-1983

**ultrasonic frequency (supersonic frequency) (ultra-audio frequency)** A frequency lying above the audio-frequency range. The term is commonly applied to elastic waves propagated in gases, liquids, or solids. Note: The word ultrasonic may be used as a modifier to indicate a device or system employing or pertaining to ultrasonic frequencies. The term supersonic, while formerly applied to frequency, is now generally considered to pertain to velocities above those of sound waves. Its use as a synonym of ultrasonic is now deprecated. See also: signal wave. (SP) [3]

**ultrasonic generator** A device for the production of sound waves of ultrasonic frequency. (EEC/PE) [11]

**ultrasonic grating constant** The distance between diffraction centers of the sound wave that is producing particular light diffraction spectra. (SP) [3]

**ultrasonic light diffraction** Optical diffraction spectra or a process that forms them when a beam of light is passed through the field of a longitudinal wave. (SP) [3]

**ultrasonic space grating (grating)** A periodic spatial variation of the index of refraction caused by the presence of acoustic waves within the medium. (SP) [3]

**ultrasonic stroboscope** A light interrupter whose action is based on the modulation of a light beam by an ultrasonic field. (SP) [3]

**ultraviolet (fiber optics)** The region of the electromagnetic spectrum between the short wavelength extreme of the visible spectrum (about 0.4  $\mu\text{m}$ ) and 0.04  $\mu\text{m}$ . See also: light; infrared. (Std100) 812-1984

**ultraviolet-erasable programmable read-only memory (UV EPROM)** See: erasable programmable read-only memory.

**ultraviolet flame detector (fire protection devices)** A device whose sensing element is responsive to radiant energy outside the range of human vision (below approximately 4000 Angstroms). (NFPA) [16]

**ultraviolet radiation (1) (illuminating engineering)** For practical purposes any radiant energy within the wavelength 10 to 380 nm (nanometers) is considered ultraviolet radiation. Note: On the basis of practical applications and the effect obtained, the ultraviolet region often is divided into the following bands:

- a) ozone-producing: 180-220 nm
- b) bactericidal (germicidal): 220-300 nm
- c) erythematous: 280-320 nm
- d) "black light": 320-400 nm

There are no sharp demarcations between these bands, the indicated effects usually being produced to a lesser extent by longer and shorter wavelengths. For engineering purposes the "black light" region extends slightly into the visible portion of the spectrum. See also: regions of electromagnetic spectrum. (EEC/IE) [126]